DOCUMENT RESUME

ED 116 144 CS 002 308

AUTHOR Gounard, Beverley Roberts; Keitz, Suzanne M.
TITLE Age Differences in Adults' Free Recall of Pictures and Words.
PUB DATE 75
NOTE 11p.; Paper presented at the Annual Meeting of the American Psychological Association (83rd, Chicago, August 30-September 3, 1975)

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS *Adult Learning; *Age Differences; Cognitive Processes; Educational Research; *Learning Processes; Memory; *Reading Processes; *Recall (Psychological); Verbal Stimuli; Visual Stimuli

ABSTRACT

This study was designed to determine whether adults' memory for pictorial and word stimuli might be differentially affected by age. Twenty female secretaries, median age 22.1, and 20 female members of a senior citizens' center, median age 69.4, were asked to learn lists of pictorial and word stimuli under free recall conditions. Eight trials were given on each list and recall was untimed to allow subjects maximum opportunity to develop and use retrieval strategies. Some of the findings indicated that pictorial stimuli were recalled significantly better than the word stimuli. The average number of errors per trial was 4.96 for pictures and 6.63 for words. The young subjects made significantly fewer errors than the old subjects. The young subjects made an average of 4.28 errors per trial whereas the older subjects made an average of 7.31 errors per trial. Performance improved for both groups as the number of trials increased. The results led the investigators to the conclusion that memory processes for the visual and verbal modes differ only quantitatively, and not qualitatively, as a function of increasing age. (MKM)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED116144

Age Differences in Adults' Free Recall of Pictures and Words

Beverley Roberts Gounard and Suzanne M. Keitz
State University of New York College at Buffalo

Previous studies with college-age subjects have generally shown that pictorial stimuli are remembered better than printed words (see Paivio, 1971, for a review). One possible reason for this is that pictorial stimuli are doubly encoded according to both visual and verbal characteristics whereas words are encoded mainly according to verbal characteristics alone. With two types of storage involved rather than one, the probability of recalling the pictorial stimuli would then be greater than the probability of recalling the words (see Paivio, Rogers, & Smythe, 1968). Another possible explanation for the superiority of picture over word recall is that pictorial stimuli must be actively labeled by subjects, and are stored more permanently because the cognitive demands are greater than when words simply have to be passively read (Davies, Milne, & Glennie, 1973).

The present study was designed to determine whether adults' memory for pictorial and word stimuli might be differentially affected by age. Much prior research has shown that older adults generally tend to do more poorly in learning and memory experiments than do younger subjects. However, there is evidence that this difference may result not so much from the older subjects' inability to use

CS 002 308

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
Beverley Roberts Gounard
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER.

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
Suzanne M Keitz
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER.

efficient encoding and/or retrieval strategies as from their failure to do so (Hulicka, Sterns, & Grossman, 1967; Treat & Reese, Note 1). If there are no qualitative differences in learning and memory between young and old adults, but simply a decline with age in the spontaneous use of efficient strategies, then it would be anticipated that the relative superiority of picture over word retention would be maintained as individuals grow older. However, if visual and verbal storage modalities are subject to differential rates of decline with age, several different outcomes would be possible. If, for example, pictorial stimuli require greater cognitive processing than verbal stimuli and old subjects are less likely than young subjects to actively engage in the necessary activities, then picture superiority might be reduced or even eliminated among older subjects. On the other hand, the involvement of two modes rather than one may be of even greater value to the old than to the young since the old are less likely to introduce new, active processing strategies into the situation. In this latter case, the superiority of pictures over words might be expected to be even more evident among the old than among the young.

In the following study, young and old adults learned lists of pictorial and word stimuli under free recall conditions. Eight trials were given on a list so that the course of learning over time could be examined, and to allow subjects ample opportunity to process items thoroughly. In addition,

recall was untimed to allow subjects maximum opportunity to develop and use retrieval strategies. Conditions favorable to the use of active processing were used so that differences resulting from a decline in the use of efficient strategies with increasing age would be enhanced.

The design of the experiment was a 2 x 2 x 8 factorial with age (young vs. old) and stimulus modality (pictures vs. words) as between subjects variables. Trials constituted the within subjects variable.

The subjects were 20 female secretaries from the State University College at Buffalo, and 20 female members of Senior Citizens' Centers in the Buffalo area. The former ranged in age from 18 to 25 years ($\underline{M}$ = 22.1, $\underline{SD}$ = 1.8) while the latter ranged from 65 to 79 years ($\underline{M}$ = 69.4, $\underline{SD}$ = 5.0). Each subject was paid $2.00 for participating in the experiment.

Twenty stimulus words which could be easily illustrated were selected from Thorndike and Lorge (1944). Mean frequency of occurrence was 12 per million. The word stimuli were prepared by using black press-on letters and 4 by 6 inch white index cards. Pictorial stimuli were black line drawings on white index cards, and were made by an art student. The following slides show some of the picture and word stimuli that were used.

Slides 1-10 shown here

The experiment was run in two replications with 10 young and 10 old subjects in each replication. In the first replication the young subjects were tested followed by the old subjects; in the second replication the order for testing the two age groups was counterbalanced. Within each age group, the subjects were randomly assigned to the picture or word stimuli.

The subjects were tested individually, and were shown 20 line drawings or the corresponding printed words at a rate of 3 seconds per item. The subjects were instructed to orally recall the items in any order, and on each of the 8 trials given, a different prearranged order of the items was used. The ordering of the stimuli was randomly determined with the constraint that each order began and ended with different items. Recall was untimed with the subjects being allowed to indicate when they could remember no more items from the list, and were ready to begin the next trial.

For each subject, the experimenter recorded the total number of errors made on each trial.

A three-way analysis of variance was computed on the data. Overall, the pictorial stimuli were recalled significantly better than the word stimuli, F (1, 36) = 7.99, $p < .01$. The average number of errors per trial was 4.96 for pictures and 6.63 for words. Also, the young subjects made significantly fewer errors than the old subjects, F (1, 36) = 26.37, $p < .001$. The young subjects made an

average of 4.28 errors per trial whereas the older subjects made an average of 7.31 errors per trial. Over the course of the 8 trials in the experiment, there was a significant decline in the average number of errors per trial from 11.53 on the first trial to 2.65 on the eighth trial for both age groups, $F(7, 252) = 126.92$, $p < .001$.

The significant main effects obtained in this experiment are consistent with those that have been previously reported in the literature. Pictures were more easily recalled than words; young people recalled better than old people; and performance improved as the number of acquisition trials increased.

It is of considerable interest to note, however, that there were no significant interactions whatsoever. The extent of the superiority of pictures over words was equivalent for the two age groups. These results lead to the conclusion that memory processes for the visual and verbal modes differ only quantitatively, and not qualitatively, as a function of increasing age. While it is impossible to specify on the basis of these results why pictures are remembered better than words, there is certainly no evidence that the visual and verbal storage modalities are subject to differential rates of decline with age.

Looking at performance across the 8 acquisition trials, it was found that the old subjects were able to improve their performance on each trial to the same extent as the young

subjects. Since the trials were self-paced in terms of response times, conditions were favorable to good performance among the old subjects. The fact that these old subjects did improve as much as the young subjects over the 8 trials suggests that the old subjects engaged in active cognitive processing of the material presented. While the cognitive strategies used by the older people may have been inferior to those used by the young, there is no indication that these strategies differed in kind, or that the old people did not attempt to meet the cognitive demands presented by the multiple trials.

In conclusion, the results of the present study provide further evidence that age differences in adults' learning and memory performance do not reflect a basic change in underlying storage processes. There is every reason to believe that optimal conditions will be defined in which the old can perform equally as well as the young.

Reference Note

1. Treat, N., & Reese, H. W. Age, imagery, and pacing in paired-associate learning. Paper presented at the meeting of the Gerontological Society, Portland, Oregon, October 1974.

References

Davies, G. M., Milne, J. E., & Glennie, B. J. On the significance of "double encoding" for the superior recall of pictures to names. Quarterly Journal of Experimental Psychology, 1973, 25, 413-423.

Hulicka, I. M., Sterns, H., & Grossman, J. Age-group comparisons of paired-associate learning as a function of paced and self-paced association and response times. Journal of Gerontology, 1967, 22, 274-280.

Paivio, A. Imagery and verbal processes. New York: Holt, Rinehart & Winston, 1971.

Paivio, A., Rogers, T. B., & Smythe, P. C. Why are pictures easier to recall than words? Psychonomic Science, 1968, 11, 137-138.

Thorndike, E. L., & Lorge, I. The teacher's word book of 30,000 words. New York: Columbia University Press, 1944.

Footnotes

Paper presented at the meeting of the American Psychological Association, Chicago, September 1975.

This work was supported in part by funds from the State University College at Buffalo Student Grant Program for the Study of Aging, 1974-1975.